

SPEECH  
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Dr. James C. Fletcher, *with*  
*minor editorial*  
*changes* Manning H. Williams  
Manning H. Williams

SPACE PROGRAM FOR THE SEVENTIES

It is like homecoming for me to visit with you this afternoon in NSIA after an absence of over seven years while I was engaged in the academic profession, which is a little bit different from the kind of endeavors we are all involved in at this time.

When I was asked to speak to the group, it was suggested that I give my views on the space program, with some emphasis on industry's role and prospects in this period of very severely restricted budgets.

Torn between the obvious need to be realistic in this group, at least, and the desire to say something cheerful, you may recall how Charles Dickens began A Tale of Two Cities. He said:

"It was the best of times, it was the worst of times..."

Now I would like to modify that a little bit: It is not the best of times, clearly, but certainly not the worst of times, either.

I am rather optimistic about the future, at least of NASA programs in both space and aeronautics.

After some years of planning, we now believe that we have very sensible goals, we have good ongoing projects, and the approved new starts which, taken together, make a package which I think is worthy of the name, at this point at least, "America's Space Program for the Seventies".

This program has been crystallizing over the last several months. But if you want a birthdate for the new program I would have to say it was on August 6, 1971, when NASA's appropriation for FY 1972 was signed into law.

I am impressed with the soundness of this new space program for the Seventies and I urge you to support it. I also believe very much that the country needs it.

Here are some of the strengths of the program as I see it:

- Perhaps the most important strength is that Congress backs it.
- It is well planned and it is well balanced to meet basic national needs, including important national security needs.
- It does stress Earth orbit as a new realm of prime importance and great opportunity, where America's capacity for world leadership will be tested not only in this decade but in the decades to follow.
- It promotes economic progress based on new technology.
- It is essential to the President's peace policies based on international cooperation.
- It is already part of America's destiny, as all of you can testify who watched the Apollo 15 operations on international television.

Now let's look at these strong points in some detail:

Our program, as I said, received a firm endorsement from Congress. The appropriation for FY 1972 was 99.94 percent of the amount requested. Attempts to kill the Space Shuttle and to stop Space Station studies were both defeated by very large majorities, two to one at least, in both House and Senate. We were authorized to begin development in this fiscal year of three major new programs for this decade -- the Space Shuttle, the Outer Planets Spacecraft, and the High Energy Astronomical Observatory.

Our new program is well planned, and already, I believe, well pruned.

The new program is also logical. It is a logical follow-on to the great -- in my humble opinion -- technological pioneering that we did in the Sixties. It is the logical lead-on for more intensive and more economical uses of space in the Eighties and the Nineties.

The new program is balanced in what I think are five very distinctive but important ways:

1. We do not have one dominating goal, but several. Last decade it was Apollo. This time we have several. We are building new spacecraft to explore the planets, to gain scientific knowledge, and to accelerate the flow of practical benefits.

2. We have struck a balance between using present technology for immediate benefits and developing new technology for future benefits. This is a most important kind of a balance, perhaps the most difficult to achieve and maintain in any government-sponsored program. There is always a temptation, when budgets are cut (this is not unique to government; it is also true in industry) to neglect the new technology for future use in favor of current benefits. But I believe that such shortsightedness could prove very costly to the Nation in the long run.

The Space Shuttle is a good example of a major investment over a long term for future benefits. Basically it is a seven-year investment and most of the benefits will be achieved in the 1980s. We have given it a high priority and we want to keep it on that high priority.

3. Our current program is also balanced on the old and some times highly emotional question of men versus machines in space. We don't put undue stress on either manned or unmanned systems. We intend to use both, choosing whichever is most natural for any particular assignment, or combining the two as the occasion demands.

With the Space Shuttle, for example, the arguments from the last decade over men versus machines in space are no longer relevant. The Shuttle provides a more economical way and a more satisfactory way of putting both men and automated spacecraft into Earth orbit.

The manned Shuttle will do much more than just "put" machines in orbit; the men in the Shuttle will check out the automated spacecraft, deploy them, repair them, and retrieve them for return to Earth as necessary. And those of you who are in both the commercial and the military end of the spacecraft business know that many of our spacecraft could be rejuvenated if we had some way to go up there and bring them back. When appropriate, the Shuttle will take scientists right into space along with their experiments.

In other words, we will use men and machines in Earth orbit in the same rational way that we have on the Moon -- and as we do on Earth, for that matter.

4. Our current program is also balanced to meet national defense needs as well as civilian needs. This is part of our charter, and applies especially to the Space Shuttle and to the Space Transportation System of which the Shuttle is a part. For example, about 50 per cent of the Shuttle payloads, we believe, at least, will be military payloads.

5. Another kind of balance that is perhaps more interesting to you, particularly if you worry about budgets, is the balance we have between the very urgent need to develop a program that our Nation can be proud of and the well recognized need to be thrifty in the commitment of our major national resources.

National priorities have changed since the Sixties, and NASA's planning has been responsive to these changes. This results in a planned maximum expenditure for the immediate future more austere than peak expenditures in the Sixties by a factor of almost two. This, I believe, is being responsive to the changing priorities.

As technology matures, the old emotional arguments about how space must be used seem to tend to fade away. There are obviously many many uses of space and many many users. Almost every Cabinet department, for example, has an oar now in the space program. And it is not easy to balance these needs, but nevertheless we plan to serve them all and we are at the moment serving them all, but of course within the limits of our budgetary guidelines.

Our new space program for the Seventies has won strong support, generally, because it stresses the potential of near-Earth space. When we aimed the Apollo spacecraft at the Moon in the last decade, there was concern that areas closer to Earth might be neglected. But what Apollo did was to provide the goals and schedules for tremendous technological advances which we can now put to use in Earth orbit -- first with Skylab, then with the Shuttle, and eventually with a major Space Station, which will probably be launched some time in the Eighties.

I believe that the new space program for the Seventies has an important contribution to make at this time to the American economy. I think I can say that our program fits in well with what the President wants -- and what we all want, I believe -- America to be: strong, productive, competitive, and confident, and, what I believe is more important still but hard to put into words, imbued with a sense of destiny.

NASA has been impressed and encouraged by the President's call in his address to Congress on September 9 for "new programs to ensure the maximum enlistment of America's technology in meeting the challenges of peace;" and also by his promise to present these programs in the next session of Congress.

I am very pleased that the President is stressing the importance of new technology. I think it is time to turn the tide, if you like, of anti-technology feeling in this country to something more constructive.

Technology, in my judgment, has made this country great and will keep it great. It is certainly true that we need adequate political controls and, if possible, social controls to keep technology the servant of man, and not his master. But nevertheless new technology we absolutely need to assure jobs and a better life for all Americans in the decades ahead.

Think back 50 years ago, or 60 years ago, and ask how many companies exist now that did not exist 50 years ago, and what percentage they are of the total number of companies in the United States. You will find very few persons here today, of course, who are involved in companies which would exist without new technology. But that's true for the country at large, too.

Our society, I believe, needs specialized institutions to force the production of advanced technology.

NASA is such a specialized institution, perhaps one of the best this country has or will ever have, because of the unique challenges and unlimited opportunities in space. The other day Astronaut Jim Irwin, addressing the Congress, made this statement: "America needs space to grow!"

For all these reasons, I tend to discount the loose talk that you often hear about the country's alleged "disenchantment" with the space effort. I believe that our current sensible, balanced, applications-oriented program for the Seventies will continue to earn the enthusiastic support of the Administration, the Congress, and the American people.

Space exploration and use have become the destiny of a pioneering nation. That's not the first time that has been said, but I think it needs to be re-said. We here today know this. I believe that the American people, in their wisdom, are beginning to sense this, too.

I don't believe many of our fellow citizens would say yes to a pollster who asked whether they wanted to default to the Russians in space, and make Earth orbit off limits to Americans.

The space program for the Seventies increases opportunities for significant international cooperation -- this is the other aspect of the President's policy -- with both the Soviet Union and Western Europe and other friendly countries, particularly Japan.

Space cooperation which shares costs and benefits, including the opportunity for other countries to work with us at the leading edge of aerospace technology, is a basic element in the President's foreign policy.

I am very much encouraged with the progress we have made in recent talks with the Soviets on the possibility of greater cooperation between our two countries.

They have suggested that we consider a docking with one of our command and service modules and one of their more advanced Salyuts, which they have not described to us but nevertheless plan for 1974; and we are seriously considering that mission.

When we have developed a large Space Station, we could send American astronauts and scientists to live and work in space with representatives of many countries from all over the world.

At the present time, Skylab accommodates only three persons, but space stations of the future not only can accommodate larger numbers, particularly of foreign observers, but in my judgment undoubtedly will. They may very well insist on it.

Recent Soviet failures and our clear superiority in the Apollo program do not give us any reason for complacency, however, regarding Soviet capabilities or their intentions in their space program for the next decade.

It is very clear that the Soviet Union has a space effort which exceeds that of the United States by approximately 60 per cent and still leads this country by a significant margin in planetary exploration and Space Station capability.

The Soviet Salyut Space Station is two years ahead of our Skylab. The recent accident in which three Soviet cosmonauts died did not occur in the Salyut Space Station but while the men were returning to Earth in their Soyuz spacecraft.

Another example. We have one spacecraft en route to orbit Mars in November; the Soviets have two much larger spacecraft on the same course, and they may very well plan to land on Mars. Our first attempt to land on Mars will not come until 1976.

I believe, too, that the large Proton spacecraft which the Soviets have been using since 1965 for cosmic ray experiments may have given the Soviets a significant advantage in high energy physics studies. Our High Energy Astronomical Observatory, which will make us more competitive in this important field, will be launched in 1975.

The Soviets have given every indication that they plan to concentrate their manned space flight activities in Earth orbit for some time to come. Their Salyut Space Station appears to be a very small first step, much as our Skylab is intended to be.

Now we have to move ahead very deliberately but resolutely with our Shuttle development and a Space Station if we intend to compete with the Soviets or to cooperate with them in Earth orbital space.



I have no desire -- and no expectation -- of presiding over a bobtailed space program that would give the Soviet Union a monopoly on manned flight. And I am sure that most of you have that same feeling.

By concentrating on Shuttle development in this decade, we recognize that there will be periods after 1973 when the Soviets are flying exciting missions -- some with men and some without men -- and we are not. And this may go on for several years during this decade. That would not constitute a Soviet monopoly by my definition. We can accept such periods of temporary Soviet advantage if (and this is a big if) -- if we know that we are making rapid progress on our multi-purpose, reusable, advanced technology Shuttle. We will expect to be ahead of them again when the Shuttle becomes operational during this decade.

Perhaps it would be useful to bring you up to date -- since you are involved, many of you, in aircraft industries and industries that deal with Shuttle technology -- on where we stand in the Shuttle program at this moment in time.

As you know we have four major contractor studies and several NASA in-house studies on various alternative approaches to the design and development of the reusable Space Shuttle.

The contractor studies that I mentioned earlier are due for completion about the end of next month. On the basis of interim reports, we believe these studies will generate the information required for final decisions on the Shuttle design and development schedule, which will be included in the President's budget for FY 1973 and submitted to Congress in January.

We believe we will be ready to issue our requests for proposals on the Shuttle some time in December and that we will be able to let the contracts -- of course, this is a major step -- hopefully next spring; and this is contingent, of course, on White House approval.

At the beginning of the Phase B definition studies on the Shuttle in June of last year, we specified, on a tentative basis, a fully reusable two-stage Shuttle, with the Booster and the Orbiter stages to be developed concurrently.

We are now considering the advantages and disadvantages of developing first an interim expendable Booster and later a fully reusable booster (with the Orbiter having the first priority). We are also considering the possibility of using F-1 engines from the Saturn V first stage in both the interim Booster and the reusable Booster, rather than advanced hydrogen-oxygen engines evolved from the Saturn J-2 engine.

We have been impressed by the very many advantages of equipping the Orbiter with external hydrogen and oxygen tanks which could be discarded in orbit to come down in a remote ocean area. These external tanks would make the Orbiter a much smaller vehicle for space flight and re-entry.

We are also considering phased development of the Orbiter -- phased development, that is, in terms of technology. Some of the things we want to do to make Shuttle flights more economical may have to come later.

In general, a phased technology approach keeps the annual expenditures lower -- which is a very severe problem at the moment -- but total costs may rise somewhat.

I am sure this audience understands the normal process of working out the Shuttle program development and definition and the reasons for considering various economic and technological trade-offs. But others outside of this group may not. So I don't want there to be any misunderstanding about the firmness of our requirements. We defined the Shuttle 15 months ago and we have not deviated at all from those requirements.

Our plans still call for proceeding with the development of the Shuttle in 1972, and we plan to make the first orbital manned flight in 1978. There is no change in that. In view of the recent very stringent budget considerations, we are, however, studying various ways of sequencing the development, test, and the operations of this Shuttle.

We are still planning to develop a fully reusable low cost Shuttle as part of a Space Transportation System in this decade, for operational use in the Eighties and Nineties. We still think of the Shuttle as our major effort to develop new aerospace technology in this decade, and our major effort to cut space costs.

We are very favorably impressed with the Shuttle's potential for reducing not only launch costs but also the costs of designing, building, and testing operating spacecraft.

We feel you can do much better when you are building a spacecraft if you are not always worrying whether it will fail in orbit, or how long it will last -- much better in terms of cost, that is.

The Shuttle will enable us to service very expensive spacecraft in orbit, as I mentioned, and return them to Earth for repairs or refurbishing.

Now this has impact both on the NASA space program and also on the Defense Department programs, of which there are many.

I think that the recent Shuttle studies have reinforced the general belief that America's future in space in the remainder of the 20th Century depends in large measure on our skill and our determination in defining and developing the Shuttle.

This will give the rest of the world something to think about in the 1980s, if we are the only ones to have a low-cost-to-orbit booster. We would then be able to do all kinds of things that no one else in the world could, and other countries would be coming to us -- as they are now for the small boosters -- to launch their spacecraft, whether scientific or applications-oriented, such as the communications satellite. The question is left open as to whether we will launch any of their military payloads.

We fully intend the Shuttle to become a classic example of the finest kind of technological planning and management; and we will make every effort to hold down the development costs and the annual expenditure rates.

I think it is important, however, that the American people who are paying the bill fully understand that the basic purpose of the Shuttle is to sharply upgrade the capabilities of this Nation to use space, for both civilian and military purposes, and also for national and international missions, for several decades in the future.

Thus it is a very giant step forward; but on the other hand it does require a major commitment of resources for this period.

Even though the major portion of NASA's budget and know-how for the Seventies will continue to be in the space effort, we should not forget that a substantial portion will go to aeronautical research during the Seventies -- in fact, a larger proportion than in the Sixties.

NASA's Office of Advanced Research and Technology has a budget of more than \$200 million for aeronautical research in fiscal 72; and more than 4,000 NASA personnel are involved in this activity.

It is very clear that America must preserve its lead, which it now has but is in danger of losing, in civilian aviation, particularly commercial. (I am tempted to say something about the SST, but this is not the place).

I believe that you are familiar with the high priority we are giving to problems such as noise and pollution abatement, which are critical problems for the Seventies; and also with our experimental STOL research plane, which is a Short Take Off and Landing plane which can land on a 2,000-foot airstrip, which can land you in your suburb rather than miles out of the main part of the city. We are also involved in supercritical wing experiments to improve the performance of military and commercial transports in the transonic range.

You may also know about our support to military aviation in terms of a sound technological base and appropriate research test facilities.

Now I could go on at some length and talk about the need for American superiority in military aircraft. This is as important as our leadership in space.

If we want to preserve our military strength, our national security posture, we simply must regain -- or at least retain -- our leadership in military aircraft; and NASA plans, in terms of research and technology, to support that effort.

Now I would like to conclude this discussion of NASA programs with a note having to do with things you are interested in specifically. One of the principal long-range benefits of the Apollo program, as former Administrator Jim Webb often pointed out, was the demonstration of how government, industry and the scientific community can work together effectively to carry out large and complex R&D programs to meet high priority national needs efficiently on schedule within the American free enterprise economic system and under our democratic political system.

A good example of what we are doing in this regard is our recent Management Study of the NASA Acquisition Process, the so-called McCurdy report, which I hope you have had an opportunity to see.

Dick McCurdy came to us as former President of Shell Oil, so he knows very much the industrial point of view. He was Chairman of the Steering Group which prepared the report.

It covers such vital areas of NASA-industry relations as project planning, source solicitation, source evaluation and source selection, and including, I might add, new ground rules for debriefing the losers in any competition. This has become a severe problem these days as times get tougher. We hardly ever have a loser who does not get involved in some kind of a suit. So we are as anxious as you are to live according to the rules we set up and to be responsive to rules that you can recommend that we carry out in these competitions.

The same report outlines a number of ways in which NASA can improve its procedures to permit prospective contractors to work more efficiently and economically in competing for NASA contracts.

Now there is a tremendous amount of dollars that goes into these competitions, and I came from industry and I am very sensitive to these very large costs. We do not have beautiful answers yet to this problem, but Mr. McCurdy and other NASA representatives have visited a number of your companies -- at least 18 the last time I heard -- to hear your complaints and receive your suggestions on this subject. And many of the ideas from this study are already in effect, but obviously we have a long way to go in this regard.

I take this opportunity to invite your further cooperation to see that these recommendations -- and any others that you feel may be helpful -- are put into practice at NASA.

One of the many virtues of the study is that it is readable, the part that is completed. Above all else, this report helps to promote, I believe, mutual respect and understanding between NASA and our industrial partners.

It is absolutely imperative during this period of conflict and uncertainty, on the part of some at least, not to jeopardize the close working relationship between ourselves and our partners.

Despite negative reference to the military-industrial complex, I think it is absolutely imperative that we work together and think of ourselves as a team.

I will do all I can to contribute further to the development of our team and to work closely with all of you for the security and prosperity of our Nation.